UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/672,424	09/26/2003	Volker Smektala	200300138-1	8428

7590 06/28/2005

HEWLETT-PACKARD COMPANY
Intellectual Property Administration
P.O. Box 272400
Fort Collins, CO 80527-2400

EXAMINER	
HAUPT, KRISTY A	

ART UNIT	PAPER NUMBER
2853	

DATE MAILED: 06/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/672,424	SMEKTALA ET AL.	
	Examiner	Art Unit	
	Kristy A. Haupt	2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *9/26/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-12, 17-27, and 29-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Prakash et al. US 6,302,507 B1.

With respect to claim 1, Prakash et al. teaches a method for calibrating a printhead, comprising:

- Printing a swath (Column 2, Line 40)
- Measuring a temperature rise of the printhead during the swath (Column 14, Lines 10-12)
- Calibrating an operating energy of the printhead based on the measured temperature rise (Column 12, Lines 5-9) while performing a non-test print job (Column 13, Lines 52-55)

With respect to claim 2, Prakash et al. teaches:

- Wherein calibrating the operating energy includes comparing the measured temperature rise of the printhead with an expected temperature rise (Column 12, Lines 33-34 and Lines 41-44)

With respect to claim 3, Prakash et al. teaches:

- Wherein calibrating the operating energy includes adjusting the amount of energy provided to the printhead (Column 12, Lines 45-47)

With respect to claim 4, Prakash et al. teaches:

- Wherein adjusting the amount of energy includes increasing a voltage potential applied to the printhead (Column 10, Lines 42-44 where adjusting the operating voltage implies increasing or decreasing the voltage)

With respect to claim 5, Prakash et al. teaches:

- Wherein adjusting the amount of energy includes decreasing a voltage potential applied to the printhead (Column 10, Lines 42-44 where adjusting the operating voltage implies increasing or decreasing the voltage)

With respect to claim 6, Prakash et al. teaches:

- Wherein printing a swath includes providing a test energy to the printhead which is above an expected turn on energy for printhead (Column 10, Lines 42-44 where the test energy is the operating voltage that is adjusted to be greater than the turn on energy in order to find the optimal voltage to be applied to the printhead)

With respect to claim 7, Prakash et al. teaches:

- Applying a test energy to a printhead during a printing pass at an energy above an expected turn on energy of the printhead (Column 10, Lines 42-44 where the test energy is the operating voltage that is adjusted to be greater than the turn on energy in order to find the optimal voltage to be applied to the printhead)
- Measuring a temperature rise of the printhead during the printing pass (Column 14, Lines 10-12)
- Comparing the measured temperature rise of the printhead to an expected temperature rise (Column 12, Lines 33-34 and Lines 41-44)
- Calibrating the energy provided to the printhead based on the comparison (Column 12, Lines 45-48)

With respect to claim 8, Prakash et al. teaches:

- Wherein applying an energy above the expected turn on energy includes applying an extended pulse width to the printhead during the printing pass (Column 10, Lines 42-47 where the pulse width is directly related to the energy. Therefore increasing the pulse width increases the energy, allowing it to be adjusted to a level above the operating energy)

With respect to claim 9, Prakash et al. teaches:

- Wherein applying an energy above the expected turn on energy includes increasing a voltage applied to firing resistors of the printhead (Column 10, Lines 23-29 and Lines 42-49 where the pulse width is directly related to the energy. Therefore increasing the pulse width increases the energy, allowing it to be adjusted to a level above the operating energy, which heat the firing resistors to eject ink (Column 2, Lines 18-20))

With respect to claim 10, Prakash et al. teaches:

- Wherein applying a test energy includes applying a test energy during execution of a normal print job (Column 10, Lines 42-44 where the test energy is the operating voltage that is adjusted to be greater than the turn on energy in order to find the optimal voltage to be applied to the printhead; Column 13, Lines 44-55 teach the adjusted operating pulse width is applied to the printhead while printing)
-

With respect to claim 11, Prakash et al. teaches:

- Wherein comparing the measured temperature rise (Column 13, Lines 44-52) to an expected temperature rise includes comparing the measured temperature rise with an expected temperature rise (Column 12, Lines 41-44) derived from a thermal turn on energy of the printhead (Column 13, Lines 60-67)

With respect to claim 12, Prakash et al. teaches:

- Wherein calibrating the energy provided to the printhead includes reducing a pulse width of the energy provided to the printhead (Column 14, Lines 14-16)

With respect to claim 17, Prakash et al. teaches a computer readable medium having a set of computer executable instructions thereon for causing a device to perform a method (Column 7, Lines 42-44), comprising:

- Printing a swath (Column 2, Line 40)
- Measuring a temperature rise of a printhead during the swath (Column 14, Lines 10-12)
- Calibrating an operating energy of the printhead based on the measured temperature rise (Column 12, Lines 5-9) while performing a non-test print job (Column 13, Lines 52-55)

With respect to claim 18, Prakash et al. teaches:

- A printhead (Column 1, Line 66)
- A temperature sensor coupled to the printhead and operable to measure a temperature of the printhead during a printing scan (Column 4, Lines 2-4; Column 14, Lines 9-12)

- A calibration component coupled to the temperature sensor and operable to variably adjust an operating energy provided to the printhead (Column 6, Lines 11-13 teach an energy control device (Figure 1B # 132) that communicates with the temperature sensors to regulate the operating energy delivered to the printhead) based on the temperature of the printhead measured during the printing scan (Column 13, Lines 44-48 and Lines 65-67)

With respect to claim 19, Prakash et al. teaches:

- Wherein the calibration component operable to determine a proper operating energy of the printhead by comparing a detected temperature rise of the printhead, measured during the printing scan, (Column 13, Lines 44-52) with an expected temperature rise (Column 12, Lines 41-44)

With respect to claim 20, Prakash et al. teaches:

- Wherein the calibration component is operable to calibrate an operating energy for the printhead by repeatedly comparing thermal measurements taken during one or more printing scans (Figure 6, Steps 602-610 and Column 13, Lines 52-55)

With respect to claim 21, Prakash et al. teaches:

- Wherein the calibration component is operable to calibrate an operating energy of the printhead during normal printing (Column 13, Lines 44-55)

With respect to claim 22, Prakash et al. teaches:

- Wherein the calibration component is operable to variably adjust the operating energy provided to the printhead during normal printing (Column 13, Lines 44-55)

With respect to claim 23, Prakash et al. teaches:

- Wherein the calibration component includes a set of computer executable instructions (Column 13, Lines 38-39 and Figure 6)

With respect to claim 24, Prakash et al. teaches:

- Wherein the calibration component is operable to variably adjust the operating energy by varying a pulse width of a potential (Column 13, Lines 44-55) applied to firing resistors on the printhead (Column 2, Lines 18-20)

With respect to claim 25, Prakash et al. teaches:

- A printhead (Column 1, Line 66)

- Means for applying a high energy pulse to a printhead and determining a proper operating energy for the printhead (Column 10, Lines 22-29)
- Means for comparing temperature changes of the printhead, during one or more printing scans (Column 13, Lines 52-55), with an expected temperature change (Column 12, Lines 33-34 and Lines 41-44)

With respect to claim 26, Prakash et al. teaches:

- Wherein means for applying a high energy pulse to a printhead and determining a proper operating energy (Column 10, Lines 22-29) includes a set of computer executable instructions (Column 7, Lines 42-44)

With respect to claim 27, Prakash et al. teaches:

- Wherein the means for applying a high energy pulse to a printhead and determining a proper operating energy includes a calibration component coupled to the printhead (Column 13, 44-45 and Figure 1B where the substrate temperature sensor, 140, is located on the driver head, 120, of the printhead assembly, 116)

With respect to claim 29, Prakash et al. teaches:

- Wherein the means are performed while executing a print job (Column 14, Lines 8-12)

With respect to claim 30, Prakash et al. teaches:

- Wherein the device further includes means for adjusting a firing energy provided to the printhead (Column 3, Lines 13-14)

With respect to claim 32, Prakash et al. teaches a printing system comprising:

- A printing device (Column 1, Line 41)
- A printhead (Column 1, Line 66)
- A temperature sensor coupled to the printhead and operable to measure thermal characteristics of the printhead during printing (Column 4, Lines 2-4; Column 14, Lines 9-12)
- A calibration component coupled to the temperature sensor and operable to set an operating energy for the printhead (Column 6, Lines 11-13 teach an energy control device (Figure 1B # 132) that communicates with the temperature sensors to regulate the operating energy delivered to the printhead), while the printhead is performing a print job, based on thermal characteristics measured during printing (Column 13, Lines 44-48 and Lines 65-67)

- A host device connected to the printing device and operable to transmit one or more print jobs to the printing device (Column 5, Lines 2-4)

With respect to claim 31 Prakash et al. teaches:

- Wherein the means for adjusting the firing energy includes a set of interface electronics receiving feedback from a calibration component for incrementing or decrementing a voltage potential applied to firing resistors of the printhead (Column 6, Lines 11-13 and Figure 6 where the output from step 610 is fed back to step 604)

With respect to claim 32 Prakash et al. teaches:

- Wherein the calibration component includes a calibration component operable to compare the measured thermal characteristics detected during an elevated (Column 13, Lines 44-55), applied firing energy to an expected temperature rise derived from a thermal turn on energy characteristic of the printhead (Column 13, Lines 60-67)

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prakash et al. US 6,302,507 B1 in view of Hock et al. US 5,418,558

Prakash et al. teaches:

With respect to claim 13, a computer readable medium having a set of computer executable instructions thereon for causing a device to perform a method, the method comprising:

- Measuring a change of temperature of the printhead (Column 14, Lines 10-12)
- Comparing the change of temperature of the printhead with an anticipated change of temperature (Column 12, Lines 33-34 and Lines 41-44)
- Calibrating an operating energy of the printhead (Column 12, Lines 5-9)

With respect to claim 15:

- Wherein calibrating the operating energy of the printhead includes adjusting an applied voltage (Column 10, Lines 42-44 where adjusting the operating voltage implies increasing or decreasing the voltage)

With respect to claim 16:

- Wherein calibrating the operating energy of the printhead includes adjusting a pulse width of the operating energy (Column 14, Lines 12-16)

Prakash et al. fails to teach:

With respect to claim 13:

- Applying a firing energy to a printhead which is above an expected turn on energy of the printhead to increase a temperature of the printhead while printing

With respect to claim 14:

- Wherein applying a firing energy above an expected turn on energy includes applying an amount of firing energy that is greater than an amount of energy which is typically applied to the printhead while printing

However, Hock et al: teaches:

With respect to claim 13:

- Applying a firing energy to a printhead which is above an expected turn on energy of the printhead to increase a temperature of the printhead while printing (Column 4, Lines 19-21)

With respect to claim 14:

- Wherein applying a firing energy above an expected turn on energy includes applying an amount of firing energy that is greater than an amount of energy which is typically applied to the printhead while printing (Column 6, Lines 25-33)

Therefore, it would have been obvious to one of ordinary skill in the art to modify the invention of Prakash et al. to increase the firing energy while printing, as taught by Hock et al. to receive stable drop volume (Column 4, Line 21).

Therefore, it would have been obvious to one of ordinary skill in the art to modify the invention of Prakash et al. to apply a firing energy greater than a typically applied energy, as taught by Hock et al. to insure proper print quality while avoiding premature failure of the heater resistors (Column 6, Lines 48-50).

4. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Prakash et al. US 6,302,507 B1 in view of Kneezel et al. US 5,585,825.

Prakash et al. fails to teach:

With respect to claim 28:

- Wherein the means for comparing temperature changes of the printhead include a printhead thermocouple interfaced to a calibration component

However, Kneezel et al. teaches:

- Wherein the means for comparing temperature changes of the printhead (Column 2, Lines 44-47) include a printhead thermocouple interfaced to a calibration component (Column 5, Lines 4-6)

Therefore, it would have been obvious to one of ordinary skill in the art to modify the invention of Prakash et al. to use a thermocouple, as taught by Kneezel, for the purpose of comparing temperature changes of a printhead, as it is a typical temperature sensor that is widely known (Column 5, Lines 4-6).

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kristy A. Haupt whose telephone number is (571) 272-8545. The examiner can normally be reached on M-F 7:00-3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

6/24/05
KAH
KAH

LAMSON NGUYEN
PRIMARY EXAMINER
06/24/05